European Energy Transition: challenges to suppliers

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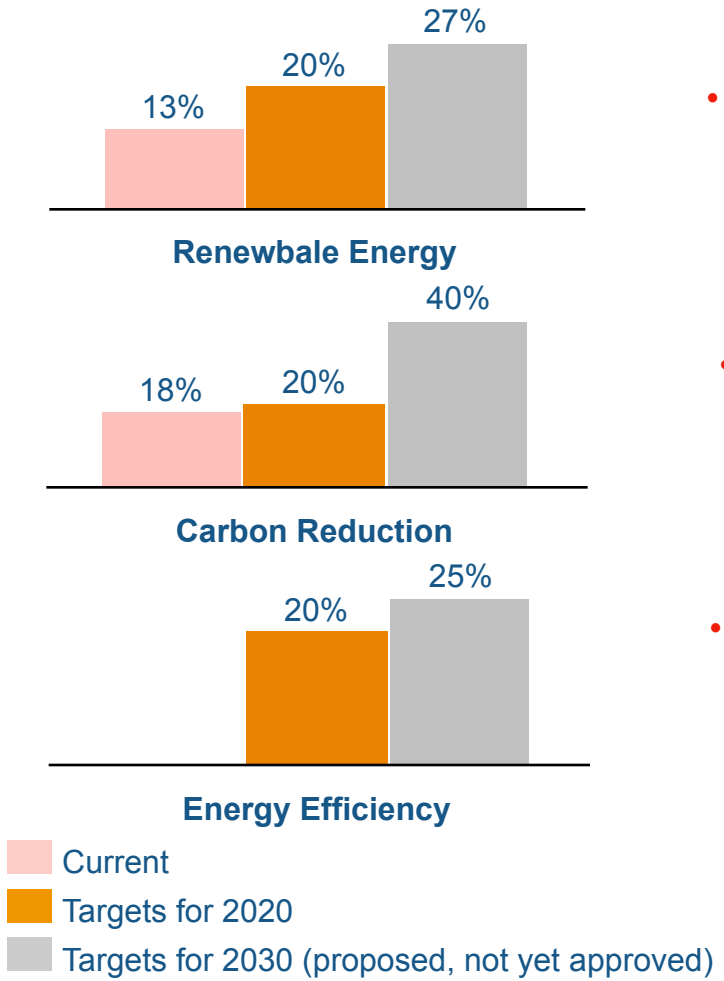
European Natural Gas Infrastructure

European Natural Gas Demand/Supply

EU sets ambitious targets for 2030



- **Renewable targets** – as % of renewable energy in the EU's total energy mix

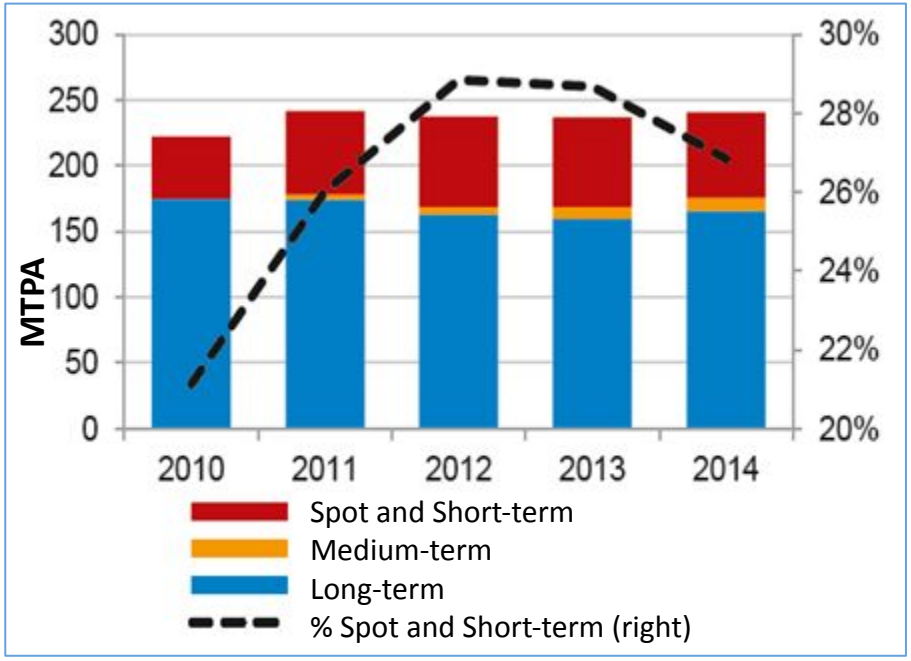
- **Carbon reduction targets –** % reduction compared to 1990 emission levels

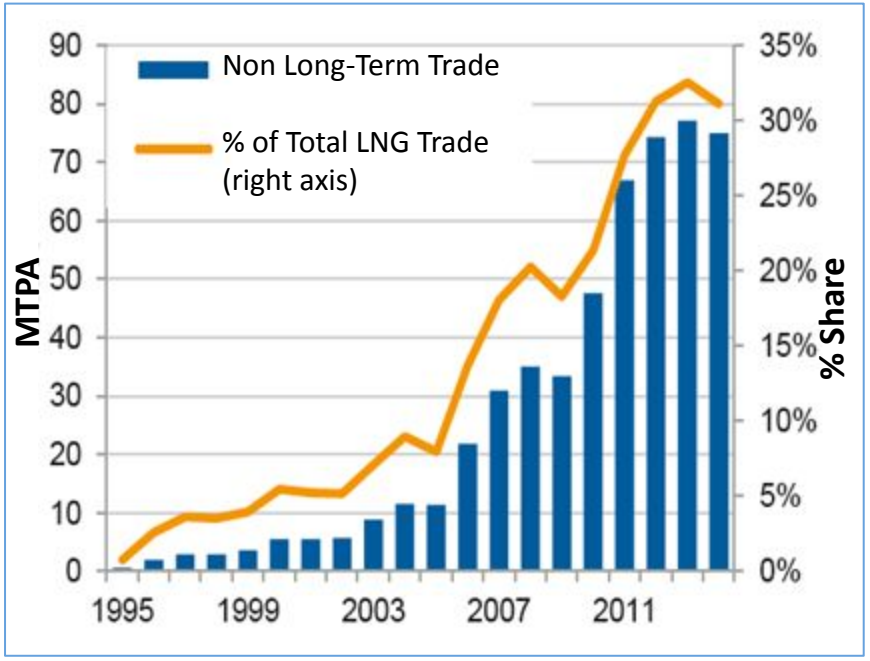
- **Energy efficiency targets –** % reduction in energy consumption compared to reference levels (varies by member state, usually established based on peak year consumption in 2005-2007

Source: EU Commission

Natural Gas Contract Duration Changes

There is evidence of both an increased overall amount of short/ medium-term natural gas trade.





Source: IGU- World LNG Report – 2015 Edition

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- Over the past 10 years there has been a large increase in the in the number of contracts with a duration of less than 5 years. [1]

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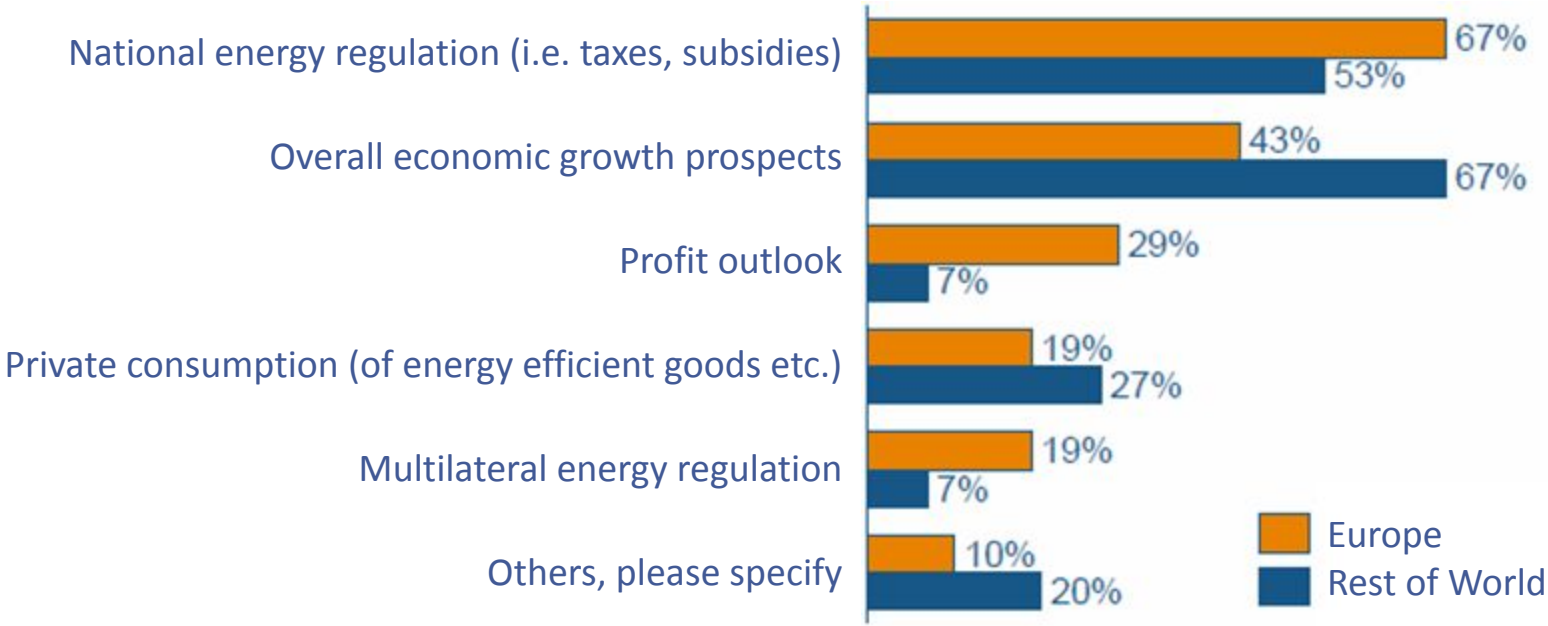
Despite the recent turmoil, the outlook for the world economy in 2020 remains unclear

- The current recovery continues to lack momentum …
- Recent indicators point to tepid economic growth in most advanced economies
  - Confidence indicators and order books are up
  - Monetary conditions are still loose, investment is picking up
  - « Austerity » stances are giving way to more neutral policy stances
  - Some concerns about possible recession before 2020
- Yet, several emerging markets are in difficulty
  - Overemphasis on commodities, lack of reforms, socio-political mismanagement ?

In Europe, national energy regulation more important for investment mood than overall growth

Question 2: Which factors are contributing most to the energy infrastructure investment mood?
(please select maximum two that apply best)



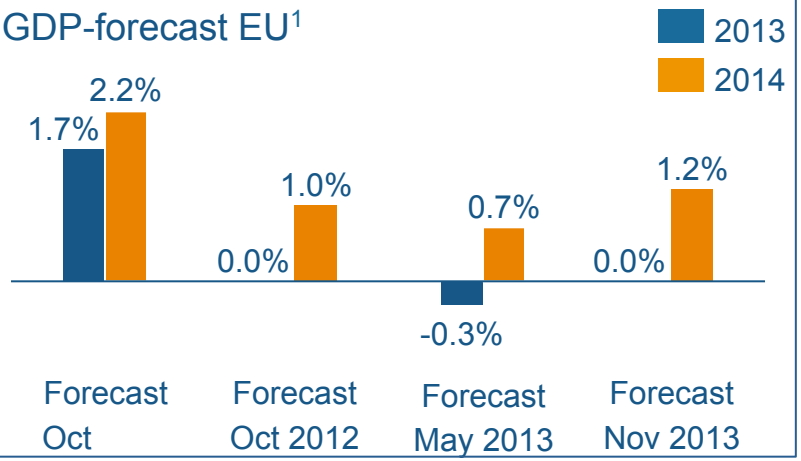
- National energy regulation more important in Europe than in rest of world, while outside Europe, overall economic growth prospects more important than regulation
- Higher influence of multilateral energy regulation reflects special European situation

Will national regulation become more predictable in a European framework?

Energy transition is happening in a weak market and challenging regulatory environment

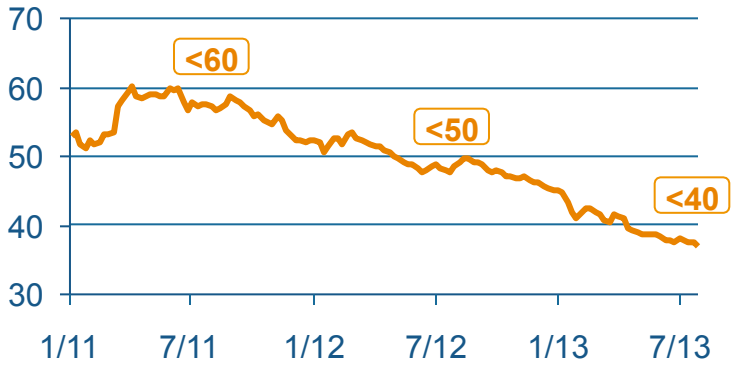
Weak macroeconomics

GDP-forecast EU[1]



Further decreasing power prices

Power Price Germany Base (y+1, €/MWh)[2]



Regulatory challenges – Examples

	Jun 2010	Nuclear fuel tax
	Sep 2010	Preferential treatment Spanish coal
	Nov 2010	Retroactive tax on solar power
	Feb 2011	Reduction of solar subsidies
	Mar 2011	“Retail Market Review”
	Mar 2011	Tax increase North Sea oil and gas
	May 2011	Withdrawal of nuc. lifetime extension
	Aug 2011	Increase “Robin Hood” tax
	Nov 2011	Doubling of nuclear tax
	Mar 2012	1. tax package to finance tariff deficit
	Apr 2012	Coal tax increase
	Jul 2012	Adjustments of RES promotion
	Feb 2013	Energy tax
	Apr 2013	Tariff cut for grid business
	Jun 2013	Robin-Hood Tax on PV
	Nov 2013	Change in promotion scheme for RES

1. Source: IHS Global Insight
2. Price for delivery next year

EU places high priority on improving energy security

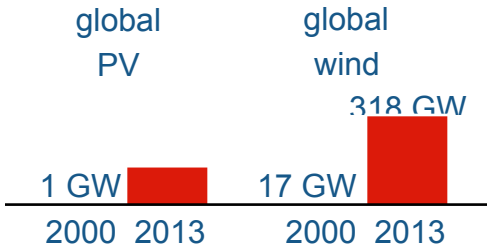
- **Increasing energy efficiency** and reaching the proposed 2030 energy and climate goals.
- **Increasing energy production in the EU and diversifying supplier countries and routes**. This includes further deployment of renewables, sustainable production of fossil fuels, and safe nuclear where the option is chosen. It also entails working effectively with current major energy partners, as well as developing new partners such as countries in the Caspian Basin region.
- **Completing the internal energy market** and building missing infrastructure links to quickly respond to supply disruptions
- **Strengthening emergency and solidarity mechanisms** and protecting critical infrastructure.
- **Speaking with one voice** in external energy policy

Dynamic innovation and technology are driving changes on energy markets

Examples

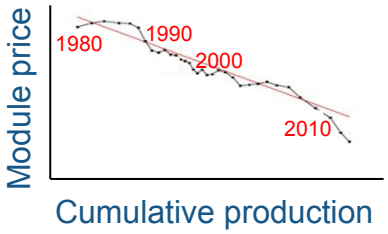
Renewable energy: substantial size

- Europe 2014: 72% of new installations (22% in 2000)



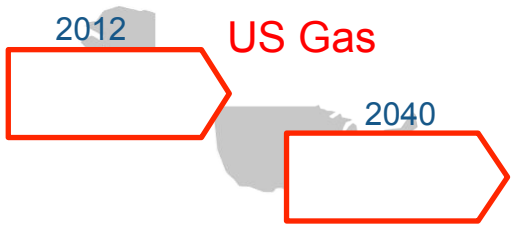
PV: cost decrease beyond expectations

- Price decreased by 20%
  each time the installed capacity doubled



Shale gas: technology „Hydraulic fracturing"

- Increasing gas resources
  change global macro economics



Source: www.iea.org

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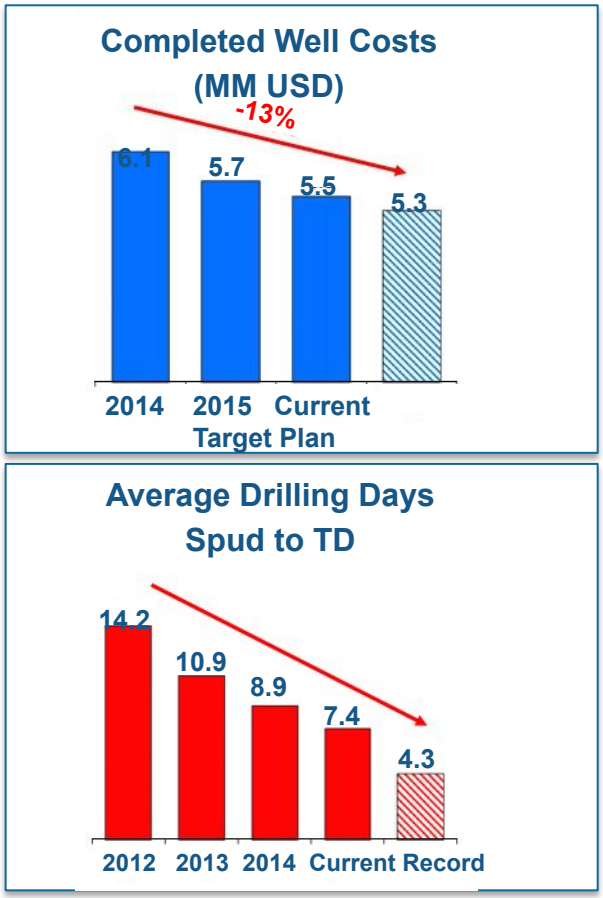
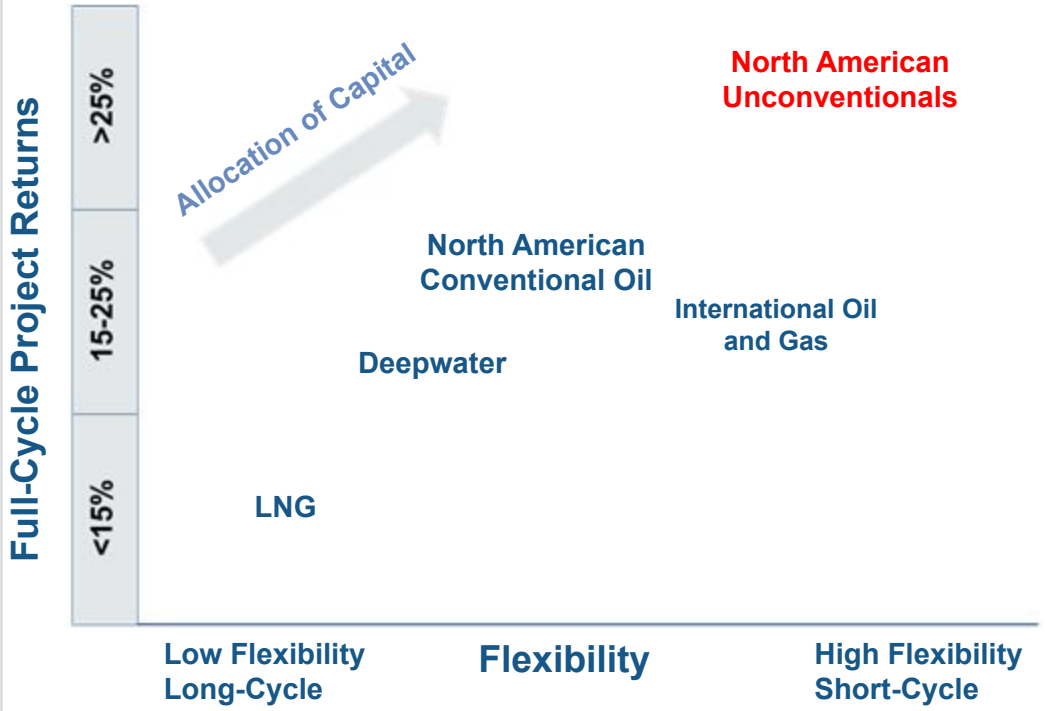
The Economics of Unconventionals are Preferred in times of Uncertainty

EOG Eagle Ford Operations



Source: EOG Investor Presentation, May 2015

Conoco Phillips: Flexibility vs. Returns by Asset Type



Source: Conoco Phillips Investor Presentation, May 2015

LNG Capacity 2008, 2014, and expected 2020 (bcm)